

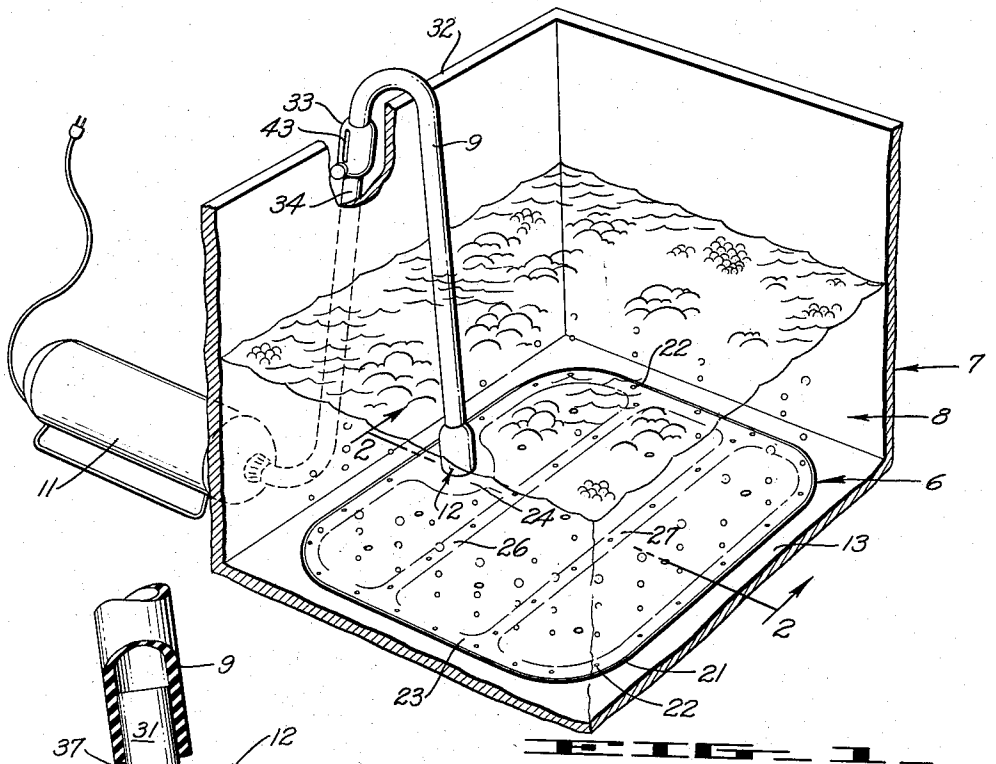
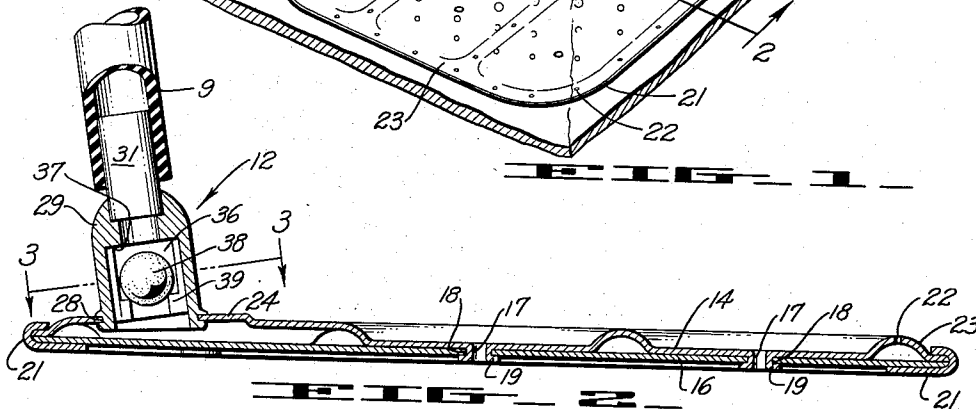
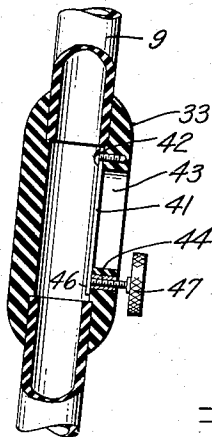
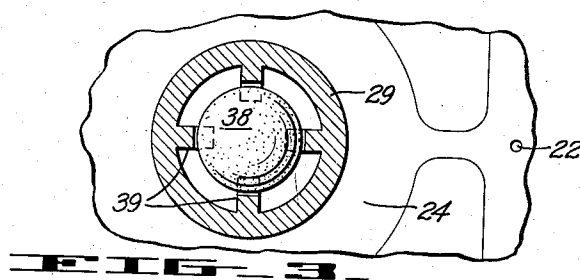
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PNEUMATIC AGITATOR FOR WASHING MACHINES

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PNEUMATIC AGITATOR FOR WASHING MACHINES

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The invention relates to agitator devices used in washing machines and more particularly to the type of agitator functioning by the discharge of air streams into the liquid content of a wash tray or the like.

Pneumatic agitators of the character described have several inherent and manifest advantages in the washing and rinsing of clothes such as the gentleness of handling of the clothes as compared with a mechanical displacement means, improved aeration and emulsification of the liquid content and in the general elimination of heavy and relatively expensive machinery. The latter feature is especially attractive where the source of air under pressure may be obtained from an ordinary vacuum sweeper otherwise used in many homes.

An object of the present invention is to provide a pneumatic agitator of the character described in which the agitator is rendered more effective than heretofore by the introduction of a vibratory or pulsating flow of the air to the liquid content of the wash tray which in turn sets up a desirable relatively high speed vibration throughout the liquid bath, materially assisting in speeding up the normal cleansing and rinsing action on the clothes in the bath.

Another object of the invention is to provide a device of the character above which may be used with a wide variety of vacuum sweepers presently in use and which may be quickly and readily adjusted to conform to the output blower capacity of such sweeper and which will function automatically to safeguard the sweeper against injury from the liquid contents of the tray upon inadvertent attachment of the device to the suction side of the sweeper.

A further object of the invention is to provide a pneumatic agitator of the character above which is of relatively simple and inexpensive construction and composed of a minimum number of parts which may be formed in a manner and of materials capable of providing a long and useful life of the device.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is understood, however, that variations in the showing made by said drawing and description may be adopted within the scope of the invention as set forth in the claims.

Referring to said drawing:

Figure 1 is a perspective view of a pneumatic

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agitator constructed in accordance with the present invention and shown operatively positioned in a wash tray, portions of the latter being broken away and shown in cross-section.

Figure 2 is a cross-sectional view of the agitator device taken substantially on the plane of line 2-2 of Figure 1.

Figure 3 is a cross-sectional view of the device taken substantially on the plane of line 3-3 with underlying portions shown in fragmentary plan.

Figure 4 is a longitudinal cross-sectional view of a manually adjustable pressure responsive valve incorporated in the device.

The pneumatic agitator illustrated in the accompanying drawing is composed of an air manifold means 6 adapted for mounting within a tub or wash tray 7 or the like for discharging a plurality of air streams into the liquid content 8 in the tray, and is provided with an air inlet conduit 9 adapted for connection to a source of air under pressure here illustrated as a conventional tank type vacuum sweeper 11. Incorporated in the device is a flow responsive vibrator means 12 which functions to impart a pulsating or vibrating action to the flow of air and also serves in the present construction as a check valve for automatically preventing a flow of the liquid in the tray back through the conduit 9 should the latter be inadvertently connected to the suction side of the vacuum sweeper.

The manifold means 6 is constructed for positioning on the bottom 13 of the tray 7 so as to generally overlie such bottom and provide a fairly uniform discharge of air streams into the liquid content 8 throughout the length and breadth of the tray. As an important feature of the present construction the manifold means also provides a sounding board action for transmitting and intensifying vibrations to the aqueous content of the tray.

A preferred construction of the manifold means consists as illustrated in the drawing of a pair of thin substantially rectangular plates 14 and 16 desirably formed of aluminum, stainless steel or other non-corrosive material and which are mounted in opposed position and secured together at a plurality of spaced points to maintain their desired assembly. As here shown, the plates may be conveniently fastened by the riveting of tubular extensions 17 formed in the plate 14 through registering openings 18 provided in the opposed plate 16, the distal ends 19 of the extensions 17 being expanded or peened over the exterior side of plate 16. This tubular connecting structure permits the drainage of liquid through the ex-

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tensions 17 as well as minimizes the buoyancy of the manifold means permitting the latter to remain at all times at the bottom of the tray. In operation any air entrapped under the plates may escape upwardly through these tubular openings. Of particular importance in the present construction is the location of the fastening means for the plates at spaced points over the plates so as to provide therebetween resonating plate portions which provide the sounding board effect above discussed.

To provide an attractive trim for the manifold unit and prevent marring or scratching of the tray and to dampen the vibration which would otherwise be transmitted to the tray and to attenuate the resulting noise, I prefer to provide around the periphery of the manifold unit a cushion or bumper strip 21. This strip may be formed of any suitable soft compressible material such as rubber or the like and is preferably made as an endless ring of channel cross-section which may be quickly and easily snapped into position over and around the peripheral edge of the manifold plates as illustrated to provide a finished trim.

The discharge of air streams from the manifold unit 6 is effected by means of a plurality of openings 22 formed in the plate 14, normally the upper plate of the unit when properly positioned in the bottom of the tray as depicted in Figure 1. Preferably the apertures 22 are arranged in uniformly spaced relation around the upper plate 14 adjacent its periphery and in rows across the plate to provide a uniformity of distribution of air streams in the aqueous content of the tray. In the present construction the upper plate 14 is formed with a raised annular rib 23 extending generally around the plate and registering with a raised air receiving portion 24. Intersecting the rib 23 are a pair of parallel longitudinal ribs 26 and 27, the latter being also communicated with the portion 24. In this manner the air is properly directed from the receiving portion 24 to the several channels provided by the ribs 23, 26 and 27 and, as will be seen from the drawing, the apertures 22 are uniformly spaced along these several ribs. The arrangement of the ribs provides a desirable reinforcing of the top plate.

Entry of air to the manifold is effected by an inlet opening 28 provided in the raised air receiving portion 24. Connection of the inlet conduit 9 to the unit at the opening 28 is here conveniently effected by a fitting 29 fastened at its base to the plate portion 24 in registration with the opening 28 and having an upwardly projected tubular end 31 onto which the lower end 32 of the conduit 9 may be tightly telescopically engaged. Desirably the conduit 9 extends from the fitting 29 up and over the top edge 32 of one of the tub side-walls and back down the outer side of such wall to a second fitting 33 where a convenient attachment may be made to the end of a conventional vacuum sweeper hose 34. Where a vacuum sweeper 11 is used as a motivating source of air the hose 34 is of course attached to the blower side of the sweeper.

As an important feature of the present invention and as above noted means is provided for inducing a vibratory or pulsating action in the air flowing to the apertures. In the present construction this means is combined with a check valve, incorporated in the fitting 29, for preventing back flow of liquid to the vacuum sweeper should the hose 34 be inadvertently attached to the suction side. Various types of vibratory check

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valves may be used for this purpose. In the present construction the fitting 29 is in the form of a hollow valve body having an internal valve chamber 35 provided with a valve seat 37 at the top side thereof. A spherical or ball type valve 38 is mounted within the chamber 35 and normally supported upon a plurality of radial ribs 39 in spaced relation to the seat 37, thereby permitting the free flow of air to the manifold unit. As an important feature of this construction, however, the ball valve is made of a buoyant, resilient material such as soft or sponge rubber or the like so that in normal operation of the unit the ball will be carried up to the seat 37 and will be displaced away from the seat by the incoming air. With such a ball and proper proportioning of the valve body the ball will be driven away from the seat and caused to bounce or oscillate between the ribs 39 and the valve seat to cause thereby an interrupting or pulsating effect on the incoming air. On the other hand, should the hose 34 be inadvertently connected to the suction side of the vacuum sweeper the ball valve 38 will be drawn up and held firmly against the seat 37 to thereby seal off the back flow of liquid.

Some control over the pressure of the air applied to the manifold is highly desirable so as to obtain a desired degree of turbulence and agitation of the aqueous content of the tray. With certain of the more powerful vacuum sweepers the action of the present unit, particularly with shallow water in the tray, is too violent and causes the throwing of water completely out of the tray. Accordingly there is preferably incorporated in the air inlet line, conveniently in the fitting 23, an air pressure regulating valve 41 which may be manually adjusted to selectively reduce the applied pressure. As here shown, the valve 41 is of a flat flapper type secured along one edge 42 to the interior wall of fitting 23 across a discharge or bleeder opening 43. Relative opening of the valve 41 is effected by a set screw 44 threaded through a wall of the fitting 33 below the opening 43 and engageable with the lower end 45 of the valve 41, that is opposite to the attached upper end 42. Manual adjustment of the valve is obtained by an enlarged head 47 provided on the screw 44. In this manner by rotation of the screw the valve may be selectively opened to divert air to the atmosphere and thereby bleed off any undesired excess pressure. The valve as here illustrated has an additional function in automatically responding to a sub-atmospheric pressure condition in the conduit, in that such condition will open the valve to thereby admit air from the atmosphere to satisfy the sub-atmospheric pressure. Thus, should the hose 34 be inadvertently connected to the suction side of the vacuum sweeper during operation of the latter, valve 41 will immediately swing open to thereby break the vacuum connection to the manifold unit. Additionally the opening of valve 41 permits the introduction of air to the sweeper hose which prevents overheating and possible burning out of the sweeper motor which might otherwise occur.

I claim:

1. A device of the character described comprising, air manifold means adapted for connection to a source of air under pressure and formed for positioning within a wash tray or the like and provided with a plurality of apertures for discharging air streams into liquid contents of said tray, and flow interrupter means imparting a pulsation to air flowing in the direction of said

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apertures and checking the flow of liquid in a reverse direction.

2. A pneumatic agitator for washing machines comprising, an air manifold formed for positioning within a wash tray or the like and composed of a pair of opposed plates secured together at spaced points to provide between such points spaced apart and resonating plate portions, said manifold being formed with an air inlet opening adapted for connection to a source of air under pressure, the resonating plate portions of one of said plates being provided with a plurality of apertures for discharging air streams into liquid contents in said tray, and air flow responsive vibrator means imparting a pulsation to the air

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flow to said apertures to cause a resonating of said plate portions.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,190,638	Furman	July 11, 1916
1,634,022	Dalton	June 28, 1927
1,703,967	Sperr	Mar. 5, 1929
1,848,531	Lamb et al.	Mar. 8, 1932
1,920,719	Stich	Aug. 1, 1933
2,051,441	Ellis	Aug. 18, 1936
2,556,517	Broussard	June 12, 1951